

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

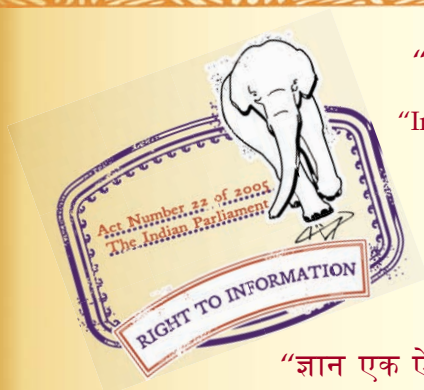
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 14722 (1999): Technical Drawings - Simplified Representation of Moulded, Cast and Forged Parts [PGD 24: Drawings]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



IS 14722 : 1999
ISO 10135 : 1994

भारतीय मानक

(Reaffirmed 2004)

तकनीकी ड्राइंग — सांचे में ढले, ढले हुए व फोर्जित
भागों का सरलीकृत निरूपण

Indian Standard

TECHNICAL DRAWINGS — SIMPLIFIED
REPRESENTATION OF MOULDED,
CAST AND FORGED PARTS

ICS 01.100.20; 77.140.80; 77.140.85

© BIS 1999

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 1999

Price Group 5

NATIONAL FOREWORD

This Indian Standard, which is identical with ISO 10135 : 1994 'Technical drawings — Simplified representation of moulded, cast and forged parts' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of Drawings Sectional Committee and approval of Light Mechanical Engineering Division Council.

This standard specifies rules and conventions for the simplified representation of moulded, cast and forged parts on technical drawings.

The text of ISO has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is especially drawn to the following:

- a) Wherever the words, 'International Standard' appear, referring to this standard, they should be read as 'Indian Standard'.
- b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a full point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the editions indicated :

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 128 : 1982	IS 10714 : 1983 General principles of presentation on technical drawings	Identical
ISO 1101 : 1983	IS 8000 (Part 1) : 1985 General tolerancing on technical drawings : Part 1 Tolerances of form, orientation, location and run-out and appropriate geometrical definitions	do
ISO 7083 : 1983	IS 11158 : 1984 Proportions and dimensions of symbols for geometrical tolerancing in technical drawing dimensions	do
ISO 13715 : 1994	IS/ISO 13715 : 1994 Technical drawings — Corners — Vocabulary and indication on drawings	do

The Sectional Committee responsible for the formulation of this standard has reviewed the provisions of ISO 1302 : 1992 to which reference is made in the text and decided that it is not acceptable for use in conjunction with this standard. The committee further decided to make reference of ISO 1302 : 1978 which is acceptable for use in conjunction with this standard and has already been adopted as IS 10719 : 1983 'Method of indicating surface texture on technical drawings'.

The Sectional Committee responsible for formulation of this standard has reviewed the provisions of the following ISO standards to which references are made in the text, and decided that they are acceptable for use in conjunction with this standard:

- | | |
|-------------------|--|
| ISO 3461-2 : 1987 | General principles for the creation of graphical symbols — Part 2 : Graphical symbols for use in technical product documentation |
| ISO 8062 : 1994 | Castings — System of dimensional tolerances and machining allowances |

Indian Standard

TECHNICAL DRAWINGS — SIMPLIFIED REPRESENTATION OF MOULDED, CAST AND FORGED PARTS

1 Scope

This International Standard specifies rules and conventions for the simplified representation of moulded, cast and forged parts on technical drawings.

It also specifies the proportions and dimensions of the graphical symbols used for this representation.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 128:1982, *Technical drawings — General principles of presentation*.

ISO 1101:1983, *Technical drawings — Geometrical tolerancing — Tolerancing of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings*.

ISO 1302:1992, *Technical drawings — Method of indicating surface texture*.

ISO 3461-2:1987, *General principles for the creation of graphical symbols — Part 2: Graphical symbols for use in technical product documentation*.

ISO 7083:1983, *Technical drawings — Symbols for geometrical tolerancing — Proportions and dimensions*.

ISO 8062:1994, *Castings — System of dimensional tolerances and machining allowances*.

ISO 13715:1994, *Technical drawings — Corners — Vocabulary and indication on drawings*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 moulded part; cast part; forged part: Part produced by the use of a mould, e.g. by blowing, injection, casting or forging.

NOTE 1 In the text of this International Standard, "moulded part" is used to mean moulded, cast or forged part.

3.2 parting line: The line of division of the individual parts of the mould.

3.3 draft angle: Slope of shaping elements (e.g. on enveloping surfaces), necessary to facilitate the removal of moulded parts from the mould or the separation of the parts of the permanent mould from each other.

3.4 mismatch: Relative displacement of the outer surfaces of a mould owing to inaccuracies in the constituent parts of multipart moulds.

3.5 machining allowance: Cutting allowance left on moulded parts and blanks so that any surface defects (of castings, forgings, etc.) can be removed by subsequent machining to achieve the desired surface texture and the necessary dimensional accuracy.

3.6 shrinkage degree: Ratio of the decrease in volume of moulded parts or blanks, after cooling or solidification, to the volume of the mould.

3.7 burr: Rough remainder of material at a corner, left after either machining or a forming process.

3.8 machined part: part which requires machining in order to achieve a quality not easily attained by moulding.

4 General rule

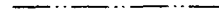
The drawings shall incorporate all the information necessary to define the moulded parts.

The representation may be complete, with dimensioning, or simplified.

5 Line conventions

In general only line types and line thicknesses in accordance with ISO 128 shall be used. Applications additional to those given in ISO 128 are shown in table 1. Rules for the presentation of graphical symbols are given in annex A.

Table 1 — Lines

Line type in accordance with ISO 128	Description	Application
A 	Continuous thick	A1 Parting line (in views)
C 	Continuous thin freehand	C1 Structures of material
J 	Chain thick	J1 Parting line (in sections)
K 	Chain thin double-dashed	K1 Outline of blanks on drawings for machining K2 Outlines of finished parts represented on drawings for blanks

6 Indications on the drawing

6.1 Draft angles

Draft angles are not included in the ideal geometrical form, nor in the permissible deviations.

The position of the draft angle shall be indicated on the drawing by the position of the corresponding graphical symbol (see figure 1), and its size shall be indicated in terms of the corresponding angle (e.g. 2°) or ratio (e.g. 1:10).

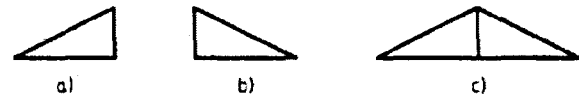


Figure 1

A draft angle on external surfaces always results in an increase in the nominal dimension a , and on internal surfaces results in a decrease in the nominal dimension b (maximum material dimension) (see figure 2).

Draft angles with slopes in two directions (e.g. at the parting line) shall be indicated using the graphical symbol shown in figure 1 c) together with an indication of the dimension of the slope (see figure 3).

6.2 Parting line

The parting line shall be indicated in views as a continuous thick line (see table 1, line type A) and in sections as a chain thick line (see table 1, line type J). The graphical symbol representing the parting line (see figure 4) shall be positioned outside the outlines, on the line representing the parting line.

The height of the permissible remaining burr (e.g. +1,7 mm) in relation to the ideal geometrical form may be indicated adjacent to the graphical symbol (see figure 5).

If it is necessary to indicate that features (e.g. burr) may be present all around the part, the peripheral lines representing the parting lines may be indicated using the graphical symbol shown in figure 6.

6.3 Deviations in shape

Permissible deviations in shape shall be indicated by general tolerances (see, for example, ISO 8062 for castings) within or near the title block. Detailed indi-

cations need be shown on the drawing only where special requirements are necessary.

6.3.1 Tolerances

Requirements which differ from the general tolerances (e.g. those given in ISO 8062) shall be indicated

by individual tolerances at the actual nominal dimension.

6.3.2 Mismatch

If it is necessary to indicate the acceptable amount of mismatch, the graphical symbol shown in figure 4 shall be indicated together with the corresponding numerical value (see figure 7).

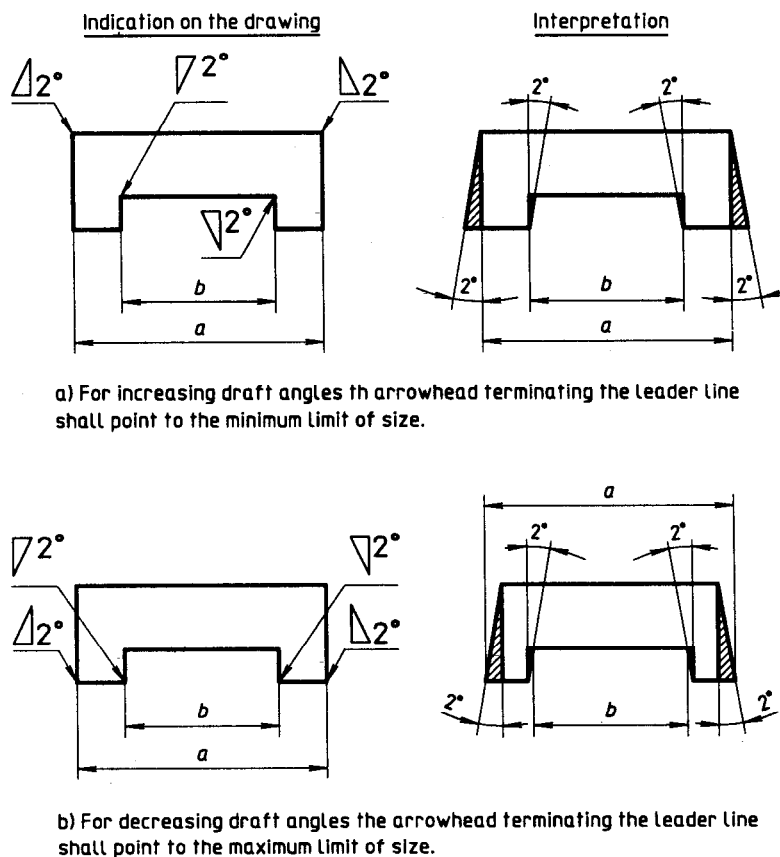


Figure 2

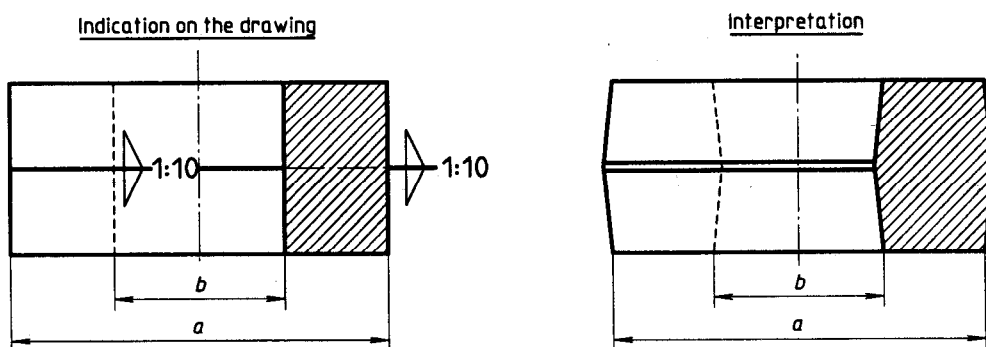


Figure 3



Figure 4

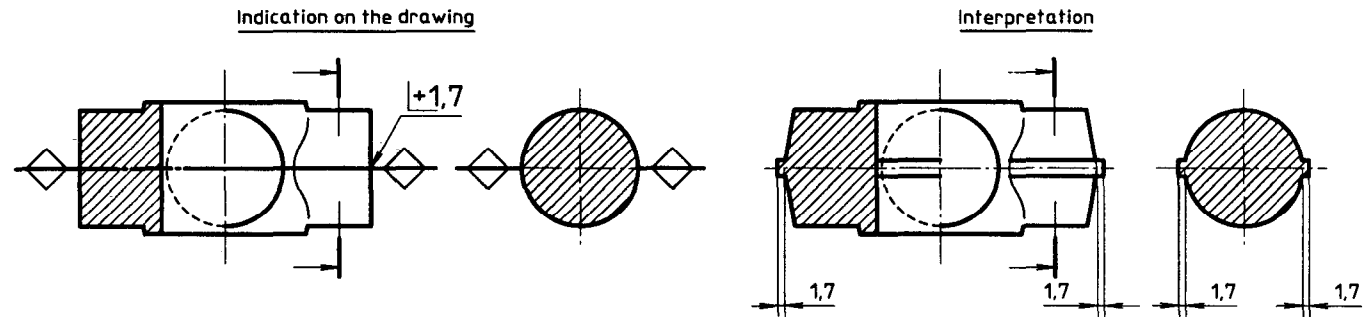


Figure 5

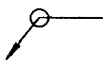
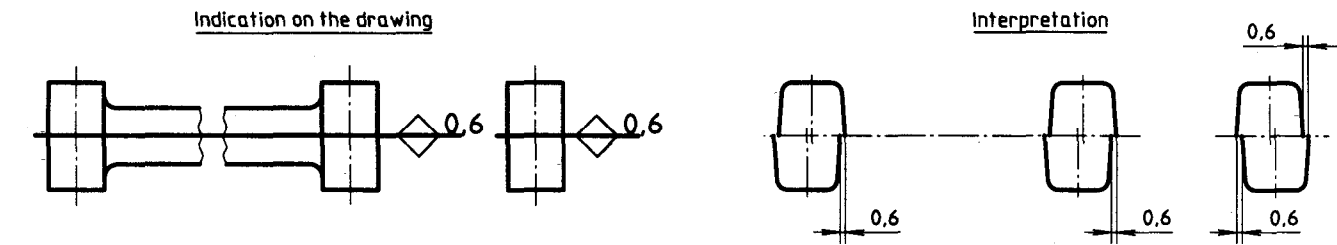


Figure 6



The upper part may be displaced relative to the lower part by 0,6 mm in two directions (tolerance 1,2 mm)

Figure 7

6.3.3 Other permissible deviations of form and position

If not included in the general tolerances, other requirements may be indicated in accordance with ISO 1101.

6.3.4 Sprues, needles, risers and ejector markings

When it is necessary to specify the size and position of sprues, needles, risers and ejector markings, they shall be indicated by a graphical symbol [see figure 8a) and b)]. This shall be placed above the remote end of a leader line (see ISO 128), which is drawn parallel to the surface indicated by the arrowhead.

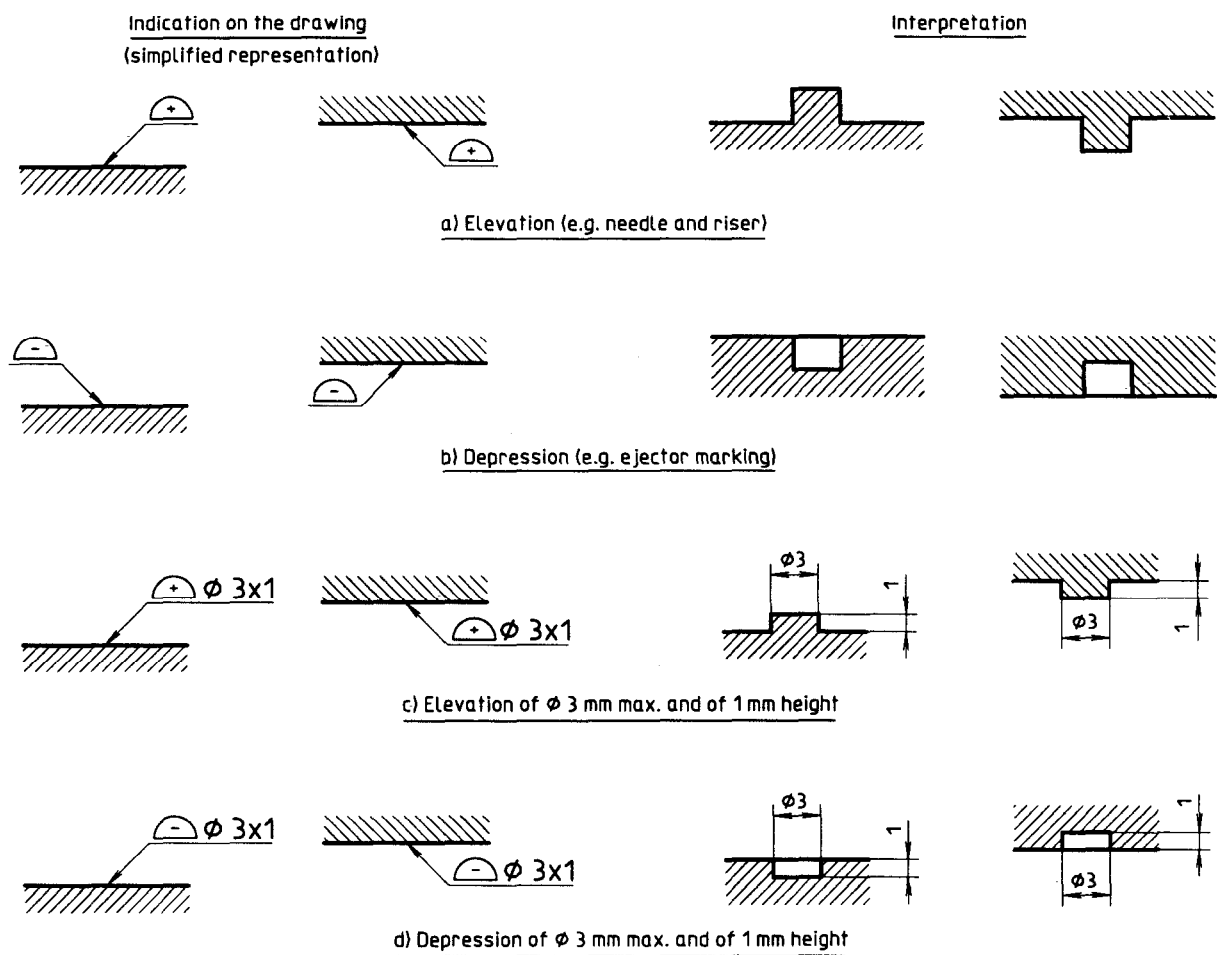


Figure 8

The permissible local deviation of the feature from the surface may be indicated by adding dimensions after the graphical symbol [see figure 8 c) and d)]. The first dimension indicates the diameter or maximum diag-

onal and the second indicates the depression below, or the rise above, the surface.

Figure 9 shows the indication of an ejector depression feature on a drop forging.

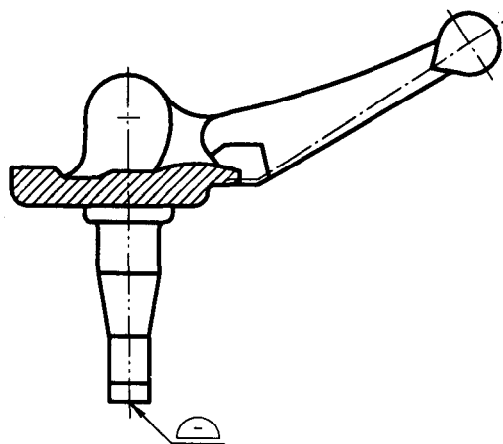


Figure 9

6.3.5 Allowance for shrinkage

In general, shrinkage is not indicated on the drawing, but is allowed for in manufacture in order to compensate for thermal expansion of the material.

6.4 Surface texture and machining allowance

The surface texture shall be indicated in accordance with ISO 1302.

Where it is necessary to specify the value of a machining allowance, this shall be indicated to the left of the symbol for surface treatment, as shown in figure 10. This indication may be accompanied by a circle

on the leader line for those values which apply to all surfaces.

Values for machining allowances shall be understood as minimum limits.

6.5 Outlines of the finished part and of the blank

On drawings for blanks the outlines of the finished part (see figure 10), and similarly on drawings for machining the outlines of the blank (see figure 11), may be represented by a chain thin double-dashed line (see table 1, line type K).

6.6 States of corners

States of corners shall be indicated by a graphical symbol in accordance with ISO 13715. Figure 12 shows an example of the indication of states of corners.

6.7 Structures of the material

Structures of the material, such as run of the fibre, grain flow, components of multicomponent materials, may be indicated, if necessary, in an additional document representing the section and the structure by continuous thin freehand lines (see table 1, line type C).

6.8 Identification

6.8.1 If it is necessary to identify the blanks, the following information shall be given:

- identification number (subject number or part number);
- manufacturer's identification mark.

The manufacturing date and a material number or a melt/charge number may also be given.

6.8.2 The position of the identification shall be specified or indicated on the drawing. It shall not be positioned at surfaces and datums which are to be machined. (It must be possible to separate the part from the mould.)

The position shall be framed using a chain thin double-dashed line (see table 1, line type K) (see figure 13).

6.8.3 The lettering shall be specified in terms of the following information:

- elevated or depressed;
- lettering height;
- kind of lettering.

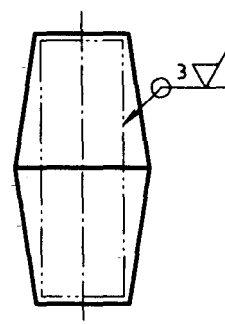


Figure 10

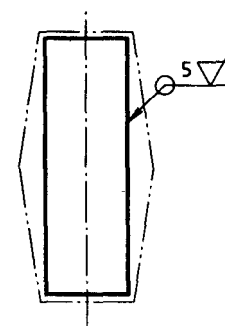


Figure 11

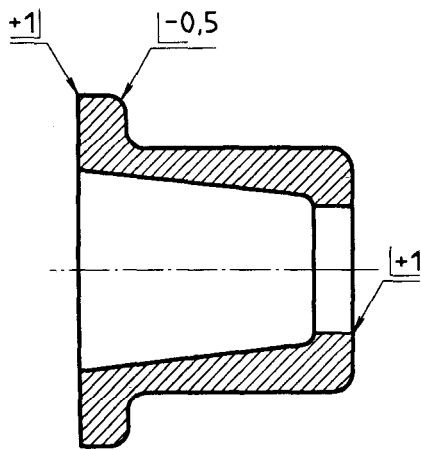


Figure 12

7 Other necessary information

In order to complete the technical documentation, further information may be necessary, concerning, for example:

- heat treatment,
- density,
- degree of accuracy,
- casting error.

This information can be obtained from standards or documents other than technical drawings.

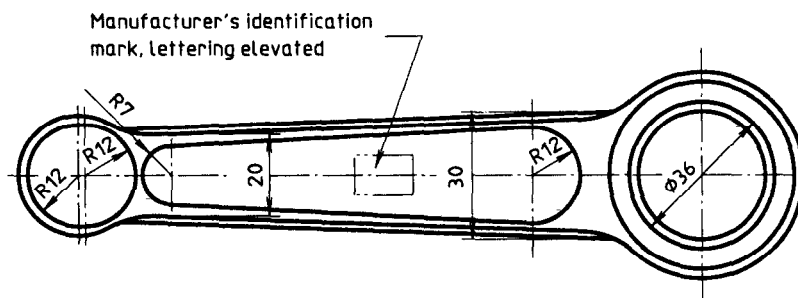


Figure 13

Annex A

(normative)

Proportions and dimensions of graphical symbols

A.1 General requirement

In order to harmonize the size of the graphical symbols specified in this International Standard with the sizes of other indications on the drawing (dimensions, tolerances, etc.) the rules given in ISO 3461-2 shall be observed.

A.2 Application

The graphical symbols given in ISO 1302, ISO 7083 and ISO 13715 shall be used.

NOTE 2 These graphical symbols are in accordance with ISO 3461-2.

A.3 Proportions

The graphical symbols and the additional indications in the area "a" shall be draughted in accordance with figure A.1.

A.4 Dimensions

The dimensional requirements of the graphical symbols and the additional indications are specified in table A.1.

NOTE 3 These requirements are in accordance with ISO 3098-1:1974, *Technical drawings — Lettering — Part 1: Currently used characters*.

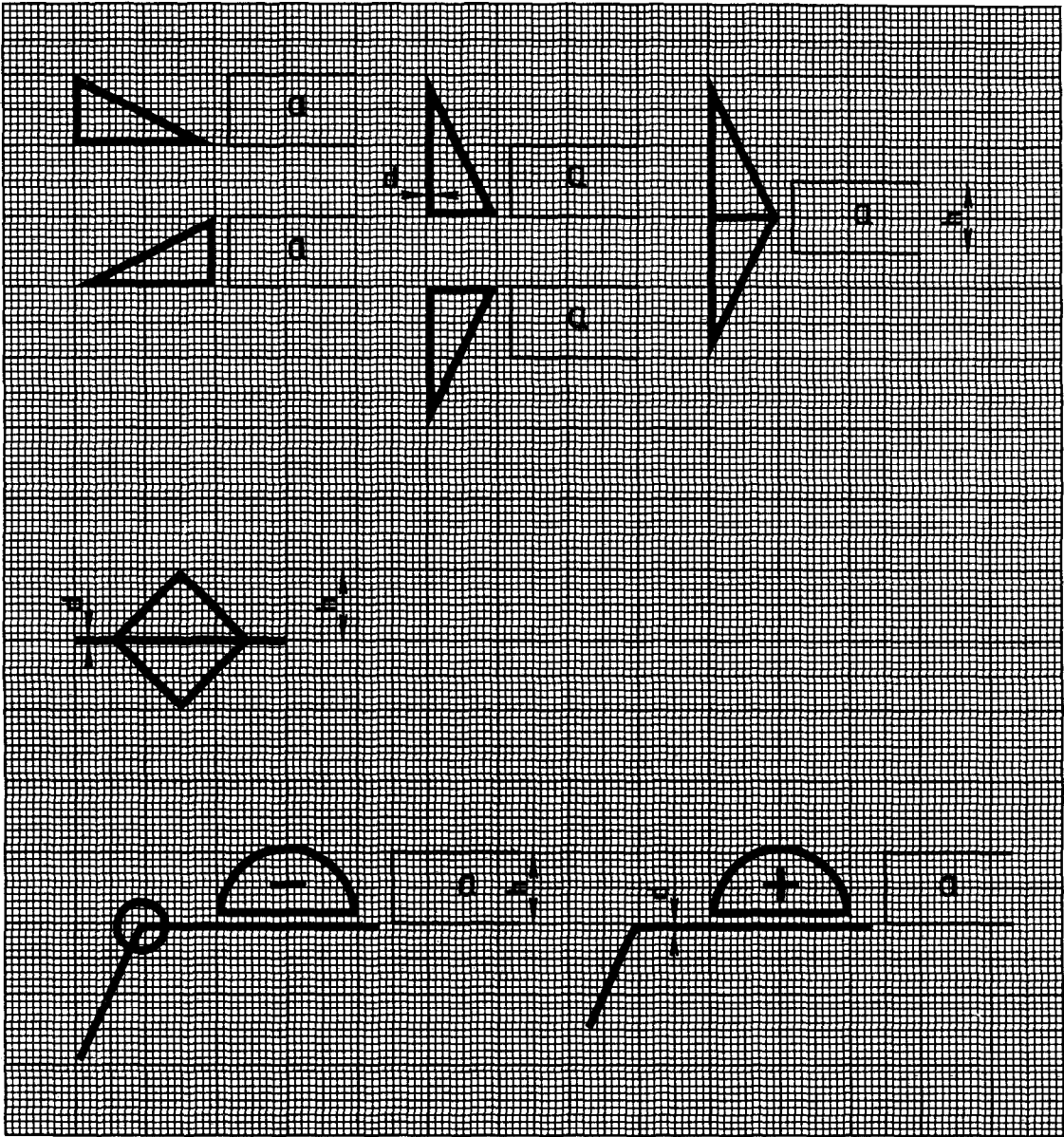


Figure A.1

Table A.1

Dimensions in millimetres

Lettering height, h	3,5	5	7	10	14
Line thickness for symbols and lettering, d	0,35	0,5	0,7	1	1,4

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards : Monthly Additions'.

This Indian Standard has been developed from Doc : No. LM 02 (0480).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 323 01 31, 323 94 02, 323 33 75

Telegrams: Manaksanstha
(Common to
all offices)

Regional Offices:

Telephone

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002

{ 323 76 17
323 38 41

Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola
CALCUTTA 700054

{ 337 84 99, 337 85 61
337 86 26, 337 86 62

Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022

{ 60 38 43
60 20 25

Southern : C. I. T. Campus, IV Cross Road, CHENNAI 600113

{ 235 02 16, 235 04 42
235 15 19, 235 23 15

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
MUMBAI 400093

{ 832 92 95, 832 78 58
832 78 91, 832 78 92

Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR.
COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR.
KANPUR. LUCKNOW. NAGPUR. PATNA. PUNE. THIRUVANANTHAPURAM.